ACE gene I/D polymorphism in type 2 diabetes: the Gujarat population

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ACE gene I/D polymorphism in type 2 diabetes: the Gujarat population

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Table 1. Distribution of alleles and genotypes for the intron16 I/D polymorphism of *ACE* gene in people with and without type 2 diabetes

		Observed genotype counts (%)			Observed allele frequencies		Expected genotype counts[a]			
	N	I/I	I/D	D/D	I	D	I/I	I/D	D/D	*p*- value*
No diabetes	445	139 (31.24)	199 (44.72)	107 (24.04)	0.536	0.464	127.72	221.17	95.68	0.102
Type 2 diabetic	290	76 (26.21)	108 (37.24)	106 (36.55)	0.448	0.552	58.29	143.55	88.45	0.0001
p-value			0.001[b]		0.001[c]					
Odds ratio (95% CI)		1.421	(1.152–1.754)							

[a] Observed versus expected according to the Hardy-Weinberg equation.
[b] No diabetes versus type 2 diabetes using the chi-square test with 3 × 2 contingency table.
[c] No diabetes versus type 2 diabetes using the chi-square test with 2 × 2 contingency table.
*Values are significant at $p \leq 0.05$.
Key: D = deletion; I = insertion.

We wish to draw attention to the increased frequency of *ACE* I/D (angiotensin converting enzyme insertion/deletion) polymorphisms in type 2 diabetic patients in the Gujurat region of India. The gene-encoding *ACE* is located on chromosome 17q23 and known to show I/D polymorphism of a 287 bp *Alu-1*-repetitive sequence (NCBI: AF118569; repeat region 14094–14381) in intron 16. This accounts for half of the variance of serum *ACE* levels in individuals homozygous for the insertion allele (II genotype) who have lower *ACE* levels than carriers of the deletion allele (ID and DD genotypes).[1] Association studies of *ACE* I/D polymorphisms in people with type 2 diabetes of different ethnicities have yielded conflicting results,[2] so we undertook a case control study to investigate the association of *ACE* I/D polymorphism with type 2 diabetes in subjects from Gujarat.

Genomic DNA was isolated from whole blood of 290 (132 males and 158 females) type 2 diabetic patients (fasting blood glucose >180 mg/dl) and 445 (205 males and 240 females) ethnically matched non-diabetic individuals. The *ACE* I/D polymorphism was genotyped and scored by polymerase chain reaction (PCR).[3]

Significant differences in the genotype frequencies of I/I, I/D and D/D genotypes were observed between diabetic and non-diabetic subjects (p=0.001) suggesting an association of the *ACE* I/D polymorphism with type 2 diabetes. The allele frequencies for I and D alleles also differed significantly between diabetic and non-diabetic subjects (p=0.001). The type 2 diabetic population deviated from the Hardy-Weinberg equilibrium for the polymorphism (p=0.0001) and the non-diabetic population followed genetic equilibrium (p=0.102) (table 1).

A recent meta-analysis of *ACE* I/D polymorphism in type 2 diabetic showed significant association with the D allele in those of Caucasian and East Asian ethnicities.[2] Our study in the

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populace of Gujarat (western India) together with others[4,5] suggests a strong link between *ACE* I/D polymorphism and type 2 diabetes at least in South Asian and Southwest Asian populations. Due to the metabolic and haemodynamic role of *ACE*, *ACE* I/D polymorphisms may be implicated in the pathogenesis of type 2 diabetic, especially in these Asian populations.

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Diary dates

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27-31 August 2011	ESC 2011 Congress of the European Society of Cardiology Paris, France Web: http://www.escardio.org/congresses
12-16 September 2011	EASD 47th Annual Meeting Lisbon, Portugal E-mail: diabetes@easd2011-lisbon.org Web: www.easd2011-lisbon.org
25-28 September 2011	European Society of Paediatric Endocrinology Scottish Exhibition & Conference Centre, Glasgow, Scotland Web: http://www.espe2011.org/
2-5 October 2011	Men´s Health World Congress 2011 Austria Centre Vienna, Vienna, Austria Web: http://www.menshealthworldcongress.org/en/
19-22 October 2011	2011 Cardiometabolic Health Congress Sheraton Boston Hotel, Boston, MA, USA Web: http://www.cardiometabolichealth.org/.
3-5 November 2011	Heart, Vessels & Diabetes Hilton Athens Hotel, Athens, Greece Web: http://www.hvd-euroconference.com/conference_2011/index.html#
11-13 November	STOCK 2011. Danubius Hotel Helia, Budapest, Hungary Web: http://www.iaso.org/events/stock-conferences/stock-2011/
27-30 November 2011	Royal Australian New Zealand College of Obstetricians and Gynaecologists (RANZCOG) Annual Scientific Meeting Melbourne Convention Centre, Melbourne, Australia Web: http://www.ranzcog2011asm.com.au/
30 November - 3 December	World Congress on Human Reproduction Melbourne Convention Centre, Melbourne, Australia Web: http://www.humanreproduction2011.com/
1-4 December	Fixed Combination 2011. 4th international conference on fixed combination in the treatment of hypertension, dyslidpidaemia and diabetes mellitus Marriott Rive Gauche Hotel, Paris, France Web: http://www.fixedcombination.com/2011/index.php
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